

## **Results of a 5-Year Field Demonstration of an Integrated Passive AMD Treatment Process**

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A 5-year technology demonstration of an integrated passive treatment process was recently completed at the Surething Mine near Elliston, Montana. Under the Mine Waste Technology Program, a multi-stage process involving sequential passage of ARD from the mine adit through three anaerobic reactors and an aerobic reactor was demonstrated. The anaerobic treatment relied on sulfate-reducing bacteria that reduced dissolved sulfate to hydrogen sulfide, which reacted with dissolved metals to form insoluble metal sulfides. This bacterial metabolism also produced bicarbonates that increased pH of the ARD and limited dissolution of metal. Seven of the eight target metals were addressed through the anaerobic process. This presentation will show that this process can offer compressive treatment for many abandoned mine sites. Water chemistry results will be presented along with the lessons learned in bioreactor design in regards to systems analysis, reactor maintenance, system flows, and establishment of manganese-oxidizing bacteria communities.

of this integrated passive process should lead to similar applications other remote abandoned mines where the use of conventional treatment methods are more costly and many times impossible to operate remotely.

This process was designed as a series of both anaerobic and aerobic bioreactors that operate in staged fashion to comprehensiveness of bioreactor applications for acid mine drainage treatment.

This process uses a series of biological systems to clean up AMD. The Integrated, Passive Biological Treatment Process utilizes nonpathogenic bacteria, which are able to neutralize acidic mine water and remove contained toxic metals. These bacteria live within a series of pit-type reactors constructed in the ground outside the mine. The bacteria are fed inexpensive waste products. The resulting discharge is clean water flowing from the mine. This presentation will show that this technology offers a comprehensive, cost-effective, natural cleanup method for the nation's numerous abandoned mines.

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